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ABSTRACT

This report assesses the effectiveness of the Napa County (California) Instructional Skills Staff Development Program, focusing on its impact on student achievement and student engaged rate in classrooms. The program, providing training for teachers and principals in administrative and instructional skills, is examined for outcomes in two schools, both with lower socioeconomic students. Data were collected on students' time on task, teachers' instructional interactions, and classroom management, and on general organizational climate and demography. Analyses focus on four major areas: (1) engaged-time rates in classrooms, (2) student achievement, (3) teacher implementation of the Instructional Skills program, and (4) correlations among the above three areas. Nine of the 14 teachers studied improved or maintained their instructional skills after returning to the classroom from the Instructional Skills program. Students in all but one classroom were more attentive during posttest than during pretest visits. Further, achievement scores show that the lowest and highest performing students made progress after implementation of the staff development program. For math, but not for reading, the program improved student engaged time and achievement. (JW)

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AN EVALUATION OF THE NAPA COUNTY OFFICE OF EDUCATION'S FOLLOW THROUGH STAFF DEVELOPMENT EFFORT TO INCREASE STUDENT LEARNING TIME AND ACHIEVEMENT

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This report describes and assesses the effectiveness of the Napa County Instructional Skills Staff Development Program as it relates to student engaged rate and student achievement.

The project was designed to accomplish two goals: to meet the immediate need to improve student achievement, and to build site-level resources to continue the process of instructional improvement after funding is no longer available. The focus of the project is on the factors related to the improvement of instructional processes, Academic Learning Time (ALT) and student achievement.

The project design focuses on the teachers, the principals, and the students. The Staff Development Program is based on many of the ideas of Madeline Hunter at the University of California in Los Angeles. The program includes training for teachers in effective classroom management and instructional skills. It also provides training for the school principal. This training includes the supervision of instruction, planning, decision making, problem solving, and allocation of resources. Follow-up activities to assure successful applicationn of skills taught during training are also encouraged. Principals have been encouraged to learn to structure meetings which will facilitate the exchange of information across grade levels regarding students and curriculum issues.

The approach is grounded in research and seems to be useful at

any grade level. It can be used with most curriculums and it does not demand any particular classroom physical arrangement in order to be implemented. In addition, the inservice training strategies model the kinds of practices which teachers and principals are taught to use in classrooms at the school. This program encourages school personnel to work together toward a common goal: student achievement.

The evaluation addresses the question of program effectiveness as illustrated by Figure 1. The staff development activities were designed to have an impact on the teachers' behavior in classrooms and on the principals' leadership skills. The improved teaching and leadership are expected to increase students' Academic Learning Time. The link between increased ALT and student achievement has been established (Fisher, 1978; Brophy, 1979; Stallings, 1978). Thus, to properly evaluate the effects of such a program, each element in Figure 1 must be assessed.

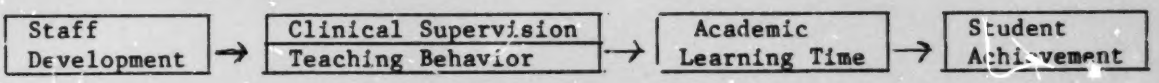

Figure 1. The Evaluation Design

The evaluation was designed to be both summative and formative. As soon as possible, analysis of the data were shared with the project director, teachers, and principals. During the past year, student level engaged rate data were given to the teachers. This occurred in fall 1982 and spring 1983. The teachers found the information so useful that they requested a longer period of time to examine the data

and discuss children who had high off task rates.

SAMPLE DESCRIPTIONS

Both schools serve a low socio-economic status population and have been receiving Title 1 funds for several years. Both schools were required to give up these funds to accept the Follow Through project. While there are many similarities among the schools, there are also differences.

School #1

A new principal was hired at School #1 for the school year beginning fall 1982. The decision to change principals was made by the project director and District Superintendent. The reasons for the change seemed to revolve around the former principal's difficulty in communicating with the teachers and a lack of willingness to implement the project goals and objectives.

The new principal in School #1 received his B.A. in History in 1958, and his M.A. in Educational Administration in 1963. He taught fourth, fifth, and sixth grades for five years. He has served as a principal for 19 years in this district.

He has been through the same Instructional Skills and Clinical Supervision training that forms the program evaluated here, but at a different location and with different trainers.

There were 26 aides working in the Bilingual, Special Education, Title I, and School Improvement Programs in 1981-82. A Special Education resource teacher worked 4-1/2 days a week. There were two Special Day Class Teachers for K-3: Language Disability and Special Education.

Health personnel included: one nurse one day a week; one Health Aide five days a week; one School Psychologist two days a week; and a

Speech Therapist 4-1/2 days a week.

The school had one and one-quarter secretaries, and two custodians.

Baseline data, spring 1982, were collected from 11 of the 16 teachers at School #1. Two teachers taught kindergarten, three taught first grade, two taught second grade, two taught third (in combination with other grades), and two taught fourth grade. Due to the difficulty in obtaining pretest data from kindergarten, a decision was made nationally to drop kindergarten from the sample. Thus only nine teachers are included in these analyses. The average number of years these teachers had taught was 17, with a range from six to 26 years. The average number of years the teachers had been teaching in this school was eight, with a range from one to 18 years.

All teachers had completed between 45 and 100 units of post-B.A. graduate work. The teachers in this school had no inservice training for the past three years because of their participation in a national study of drug education. Two of the teachers had attended the project RAISD training, which is an inservice program similar to the one being evaluated here.

School #2

The principal of School #2 has been involved in this project since its conception in the summer of 1981. He has supported his school's participation in the project and has been working closely with the project director to encourage support from the community, the school board, and his teachers since the program received approval in the fall of 1981. He has been to Washington D.C. several times to attend project meetings.

This principal received his B.A. in History in 1973 and his M.A. in Educational Administration in 1978. He served as a teacher in grades K-6 from 1973 to 1977. He was an assistant principal of a year-round elementary school for two years and became principal of School #2 in 1979. He has been a principal at this school for four years.

During the two years prior to this project, this principal went through the same inservice training in Instructional Skills and Clinical Supervision that is being evaluated. In addition, he was involved as an instructional skills trainer with the project director in the school years 1981-82 and 1982-83.

There were five Title I aides, one Bilingual aide, a Special Education aide, one Special Day Class teacher, one Title I Resource teacher, one Miller Unruh Reading teacher, one part-time Speech Therapist, one Learning Disability teacher (1-1/2 days per week), and one Title VII teacher (1 day per week) working at School #2 in 1981-82.

Data were collected for five of seven teachers at School #2. Baseline data, spring 1982, were collected from one kindergarten teacher, one first grade teacher, two teachers of second grade (combined with other grades), and one fourth grade teacher. However, the sample for the 1982-83 year is the following: one first grade teacher, one first/second, one second/third, one third grade, and one fourth grade teacher. The reported years of teaching experience ranged from five to 33 with an average of 16 years. The average number of years teaching at School #2 was nine, with a range from one to 18 years.

All teachers had completed between 45 and 78 units of post-B.A.

graduate work. As a result of participation in a multi-county staff development program, all but one teacher had attended the RAISD workshops and other inservice training in recent years.

METHODOLOGY

The contract called for selection or development of instruments to assess program outcomes at three levels: students, teachers, and principals. The instruments were developed during Phase I of the study and modified in Phase II. The instruments developed for use in Phase II of the study included: the Time On Task (TOT) observation, Instructional Skills (IS) observation, Classroom Management Ratings, The Organizational Climate Description Questionnaire, and Teacher Attitudes and Demographics Questionnaire. All of the instruments remained the same from pretest to posttest except the TOT.

Time On Task (TOT) Observation

The object of the Time On Task observation instrument is to record a sample of all students' attending behavior or non-productive use of time during two periods of reading and two periods of math. This method provides an engaged rate score for each child in the study. The engaged rate can be linked to student achievement data for reading and math. The following behaviors are considered Off-Task.

Off-Task Behaviors

C = Chatting: Low talking or whispering, passing notes between students which pulls them off task

D = Disruptive: Bothering a number of students, e.g., loud talking, throwing things, pushing or fighting

P = Personal Needs: Sharpening pencils, going to the toilet, getting a drink, getting papers or books

U = Uninvolved: Staring or sleeping

W = Waiting: Waiting with hand up for teacher's attention, waiting for materials to be passed.

Activities

It is also of interest to know what was the expected activity when students were off task. Were they supposed to be doing seat work (silent reading or written work); listening to the teacher making assignments or organizing (getting papers and books out); listening to the teacher's instructions or explanation; reading aloud; taking part in a questions/answer period (children writing math problems on the board is included); or waiting in line or for materials.

Grouping

A third interest is to know whether the off task behavior occurred at a time when the student was expected to be attending within a small group (2-10), a large group (11-total), or working alone/independent work.

Coding Procedures for the TOT

A sweep is made for off task students each five minutes. As soon as the instructional period officially begins, the observer writes the time on the first sweep column. Observers mark each student only once during a five minute sweep. They must watch the time carefully and start a new sweep at the next five minute interval.

Achievement Tests

Achievement tests were administered to the students by each teacher in May of each year. School #1 uses the Stanford Achievement Test and School #2 uses the California Achievement Test. School #1 and School #2 had made attempts to align their math curriculums with the concepts examined in their achievement tests.

Instructional Skills (IS) Observation

To assess the level of teachers' use of the prescribed teaching skills, a classroom observation instrument was designed and field tested twice before collecting data. Refinements and review by the designer of the program, Madeline Hunter, occurred after each field test.

This instrument was designed to examine a teacher's ability to use certain specific instructional skills effectively when it is appropriate that they be used. The instrument examines the teacher's decision-making skills during the presentation of the lesson. The observer records how the teacher conducts four critical elements of the program: a set, instruction, guided practice and independent practice.

The critical issue for the observer is not whether a certain element occurs, but:

* Was there a need for the use of that element?
* If there was a need, was it acted upon?
* If an element was used, was it used effectively?

The procedure was for observers to make anecdotal records of the lesson and then score the four elements on a rating scale.

Observer Training

Three observers were trained in a three-day session to collect data on the TOT in fall 1982. This training included three checks for interrater agreement in classrooms. The percent of agreement was >90%. Amazingly, the same three observers were available to collect data in the spring of 1983. A one-day training session preceeded spring data collection. These observers also rated the teachers on Management Skills. At School #1, each teacher was observed by two

observers. At School #2 one observer collected the data, but interrater agreement with the evaluation project leader was computed on two occasions. Each time this agreement was found to be between 85 and 95 percent on all ratings.

The Instructional Skills data were collected by six observers who were themselves trainers in the Madeline Hunter Model. Thus, they started their observer training with a thorough knowledge of the five-step lesson plan which was being evaluated. The training occurred over three days. Training activities included discussions of operational definitions and checks of interrater agreement during three in-class observations. Initially, agreement was hard to reach since each observer had a preconceived notion of what was good performance on each instructional skill. After much discussion and delineating operational definitions, acceptable agreement levels were reached (>.75 interrater reliability). All teachers were observed by two or more observers in the winter. In the spring, after a one-day retraining session, the same observers collected the posttest data.

Data Collection Schedule

The schedule of data collection is provided in Table 1.

Table 1

Data Collection 1982 - 1983

	Spring 82	Fall 82	Winter 82	Spring 83
Time Off Task Observations		x		x
Instructional Skills Observations			x	x
Management Ratings		x		x
Teacher Questionnaires	x			x
Achievement Tests	x			x

ANALYSIS AND RESULTS

The analyses were conducted at three levels: child, teacher, and school. The analyses focused upon four major areas: (1) engaged rate, (2) achievement, (3) teachers' implementation of the Instructional Skills program, (4) correlations between engaged rate, achievement, and program implementation.

Engaged Rate

Engaged rate was computed by observing each child once every five minutes for two reading periods and two math periods. If the class was fifty minutes long, there would be ten observations per period x four periods. Frequencies of off task behavior were recorded during the class period for each child. Off task (OT) frequency was then subtracted from the total number of observations to compute an engaged (EN) rate, e.g.:

Reading Total 20 observations - 4 OT = 16 EN
Percent Engaged = 16 / 20 = 80 %

An engaged rate was then computed for each teacher by computing a mean

and standard deviation using the engaged rates of all the students in the class. In the fall, only total engaged rate scores were computed; in the spring, scores were computed separately for reading and math. These separate math and reading engaged rates were then used in the correlations for reading achievement, math achievement, reading instructional skills, and math instructional skills.

Table 2 presents the mean percent of time students were engaged in each classroom during reading and math combined for fall and during reading and math separated for spring. The grade levels are in ascending order for each school.

Overall, the children in School #1 improved their engaged rate from fall 1982 to spring 1983 by approximately 8 percent. When compared to fall scores, all of the teachers' spring classroom engaged scores were higher in either reading or math except Teacher H. Dramatic improvement of engaged rates were found for the classrooms of Teachers A, C, G, and I. No pattern was found in School #1 for students being more engaged at higher grades. The lowest engaged rates reported are for the kindergarten class and one third grade and one fourth grade class. All of these made significant improvements during the year, but remained lower in engaged rate than the other classes. Teacher H, whose scores were less good in the spring than in the fall, seemed to have given up trying in the spring. This teacher felt the hall noises were very distracting for the children in his group. The school was designed for open space classrooms, but recent attempts have been made to provide individual rooms by arranging chalkboards and bookcases as dividers. These help with visual distractions, but the noise factor remains a problem, especially while classes of children pass through the hallways.

Table 2

Engaged Rates Fall and Spring

		Fall 1982			Spring 1983				
						Reading		Math	
Teacher	Grade Level	(N)	X	SD	(N)	X	SD	X	SD
SCHOOL #1									
A	K	29	57%	18%	28	70%	19%	72%	15%
B	1st	27	73	13	30	82	13	78	15
C	1st	30	69	14	28	87	13	82	10
D	2nd	27	81	13	27	81	11	91	8
E	2nd	24	73	14	27	80	14	72	16
F	3rd	26	74	13	27	81	13	78	16
G	3rd	27	59	16	27	63	24	77	17
H	4th	29	82	10	27	78	13	76	17
I	4th	20	84	12	21	76	10	75	15
School Score		294	70	16	238	78	16	77	15
SCHOOL #2									
A	1st	25	82%	8%	27	78%	12%	83%	14%
B	1-2	27	77	10	21	82	10	80	8
C	2-3	23	86	10	22	81	16	89	11
D	3rd	19	91	8	23	91	9	89	8
E	4th	26	87	10	15	87	12	84	14
School Score		152	84	10	134	83	13	85	12

School #2 started in the fall with a significantly higher engaged rate (84%) than did School #1 (70%). Teacher D had consistently high scores (91%, 91%, 89%). The teachers spring scores only fluctuated three to five percentage points from the fall scores. The overall school score did not change. There was a trend in this school for teachers of younger children to have lower engaged rate than teachers of older children.

Achievement

This longitudinal study has the rare opportunity to monitor students' achievement over several years. Successful schools, as Ron Edmonds points out (1981), are those which help all children make progress, low achieving and high achieving. In this study we have recorded the percent of children performing in each quartile of achievement test results. Over time, if the Instructional Skills program is implemented and if the program is effective, there should be fewer students in the lower quartiles and more in the upper quartiles.

The achievement test data gathered for Schools #1 and #2 have been examined for such trends (see Table 3). Typically, the children in the two schools of this study have on the average scored well below national norms. In spring 1983, School #1 had 5% fewer children in the lowest quartile in mathematics, and 4% more in the highest quartile than in spring 1982. A similar trend is found in reading: 4% fewer in the lowest quartile and 4% more in the highest quartile when spring 1983 scores were compared to 1982 scores. In real terms, it means that approximately ten children have shifted their scores

Table 3

Percent of Students in Each Achievement Quartile

Spring 1982 and 1983

		1st Quartile 0 to 25%		2nd Quartile 26% to 50%		3rd Quartile 51% to 75%		4th Quartile 76% to 100%	
		1982	1983	1982	1983	1982	1983	1982	1983
SCHOOL #1	Total Tested								
Reading	234	39%	34%	25%	27%	19%	18%	17%	21%
Math	232	30%	26%	27%	28%	24%	23%	19%	23%
SCHOOL #2									
Reading	131	21%	25%	27%	21%	27%	25%	25%	25%
Math	130	16%	11%	22%	17%	34%	36%	28%	36%

upward in reading and math from the lowest performing group and ten others have shifted their scores into the highest performing group.

The big shift for School #2 came in mathematics. In 1982 there were 38% of the children performing below the 50th percentile and in 1983 only 28% were performing below the 50th percentile. There were 8% more children performing in the highest quartile (>75%). The progress in math might be attributed to the staff's efforts to become more aware of what math concepts were tested on the California Achievement Test. One component of the teacher training program included math curriculum alignment activities. These types of activities were not included for reading, and reading scores at School #2 remained at approximately the same level for 1982 and 1983.

Differences in 1982-1983 Achievement Test Scores by Classrooms

Reading and math scores for each teacher were examined for differences from Spring 1982 to Spring 1983, using a two-tailed T-test for significance. The attrition rate is quite high in these schools and thus there were approximately two-thirds of the students with a complete set of test scores. Of the 14 classrooms of children examined, only those children with teachers B, C, and F of School #1 made significant gain in reading during that school year (see Table 4). Children in classrooms of teachers B and D in School #1 made significant gains in mathematics.

Children in the classroom of teacher I in School #1 had significantly lower scores on the posttest. This teacher was shifted from an administrative role to the classroom for the last two years before retirement. This teacher, as can be seen on the implementation section, improved on instructional skills, but the training came too late in the school year to counter the effect of this teacher's

TABLE 4

TESTS FOR DIFFERENCE IN READING AND MATH SCORES
PRETEST SPRING 1982 POSTTEST SPRING 1983**

		PRETEST		POSTTEST		PRETEST		POSTTEST	
	(N)	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
SCHOOL #1									
TEACHER A	18	41.2	33.3	36.6	31.4	45.6	30.4	49.8	25.4
B	22	31.9	25.2	49.9*	29.8	37.9	25.9	48.2*	26.6
C	24	38.6	34.9	52.1*	36.8	48.4	35.6	52.8	36.6
D	22	44.9	23.6	40.5	18.8	50.9	21.8	64.6*	19.9
E	21	53.6	33.0	58.9	30.1	56.8	34.1	62.0	32.6
F	23	40.9	25.7	47.2*	24.9	46.7	27.1	52.9	27.6
G	23	24.2	24.6	25.1	26.8	50.6	21.7	26.9	23.4
H	26	40.9	27.0	43.3	24.7	53.9	27.4	52.5	25.1
I	15	48.1	26.7	36.6*	25.2	55.6	27.8	41.0*	29.3
SCHOOL #2									
TEACHER A	10	54.2	26.9	31.1*	23.9	45.9	16.1	44.5	28.1
B	12	59.3	29.4	54.9	29.8	62.4	20.9	68.5	19.3
C	11	67.9	25.2	62.0	30.5	68.2	34.5	67.5	17.1
D	14	40.7	29.1	44.6	25.0	67.1	25.4	68.4	22.9
E	7	58.3	21.6	52.6	23.9	71.0	13.2	68.6	16.7

* $p. < .05$

** 2 TAILED PROBABILITY TEST

negative impact upon the students.

The children in the classroom of teacher A in School #2 had a significantly lower score in reading on the posttest. This may be explained in part by the fact that although 25 children had pretest scores, only 10 of these children remained for the spring 1983 testing. In this school district it appears that the upwardly mobile families tend to move on, leaving perhaps those children who score lower on tests.

Student Achievement Compared with Engaged Rate

Are the students who achieve at the higher levels the same students who are on task more of the time? Are children who have limited English speaking skills off task more of the time? To examine these and other relationships, children's engaged rates were organized by deciles and their achievement test scores by quartiles in a two by two table (see Table 5). These data are presented for math and reading for each school. (Similar data are available for each teacher's classroom from the evaluator.)

Of the 50 students performing in the highest reading quartile (75%-100%) in School #1, 24 were off task less than 10% of the time. Surprisingly, twelve of the high achieving students were off task 20% or more of the time. In fact, one of these students was off task 50% or more of the time. If this child is achieving at this level without using the in-class time, it may be that the lessons are too easy. A similar pattern is found for two high achieving math students.

Approximately one-fourth of the lowest achieving reading and math students were engaged in their work 90% or more of the time. This indicates that they were listening to the teacher and working on their lessons. However, according to the results of the achievement test, their efforts were in vain. It is important that teachers be aware of these children's effort to stay on task and provide appropriate lessons so that they can make progress. Perhaps by the next testing, some of these high attending low achieving children will move upward to the 2nd quartile.

Table 5

Reading and Math Achievement Quartiles

and Time Off Task Deciles by School

SCHOOL #1

	Reading Off Task Deciles						
	100-90	89-80	79-70	69-60	59-50	< 50	
Quartile	0-10%	11-20%	21-30%	31-40%	41-50%	50-100%	Total
0-25%	23	20	16	14	7	4	84
26-50%	24	16	13	5	4	4	66
51-75%	14	9	13	2	5	0	43
76-100%	24	14	4	4	3	1	50
Total	85	59	46	25	19	9	243
	Math Off Task Deciles						
Quartile							
0-25%	16	14	17	10	1	3	61
26-50%	21	13	14	11	6	2	67
51-75%	24	12	9	7	1	2	55
76-100%	15	22	10	4	1	2	54
Total	76	61	50	32	9	9	237

SCHOOL #2

	Reading Off Task Deciles						
Quartile	0-10%	11-20%	21-30%	31-40%	41-50%	50-100%	Total
0-25%	9	8	6	0	1	1	25
26-50%	9	7	5	1	0	0	22
51-75%	9	8	7	0	1	0	25
76-100%	14	9	1	1	1	0	26
Total	41	32	19	2	3	1	98
	Math Off Task Deciles						
Quartile							
0-25%	8	2	2	0	1	0	13
26-50%	4	7	6	2	0	1	20
51-75%	16	11	9	4	0	0	40
76-100%	14	15	10	1	1	0	41
Total	42	35	27	7	2	1	114

The achievement and engaged rate patterns for children in School #2 are more predictable. Over one-half of the 26 children who were achieving in the top quartile of reading were on task 90% or more of the time and only three of the high achieving students were off task more than 20% of the time. The only student off task more than 50% of the time was a low achieving student. Of the 41 children in School #2 who were engaged in their reading 90% or more of the time, 14 were in the highest achievement quartile and the remaining 27 were evenly distributed across the 1st, 2nd, and 3rd quartiles (see Table 5).

Overall, the children in School #2 were better prepared in math. Over 70% of the 114 tested were above the 50th percentile. Of these 81, 30 children performing above the national norm were engaged in their work 90% or more of the time. Interestingly, eight of the 13 children in the lowest achievement group (1st quartile) were also on task 90% or more of the time during the observed math classes.

Apparently there is not a perfect correlation between high engaged rate and high achievement or off task behavior and low achievement. Some children pay attention and still achieve poorly, others are off task and still do well academically. In either case there is something for teachers to learn about appropriate lessons and motivating children to use their time productively.

A .31 correlation ($p < .001$) was found between the math and reading engaged rate scores for the 340 children observed in both subjects. Even though significant, a .31 correlation is low and means that a considerable number of children were not engaged at the same rate in both subjects. Figure 2 illustrates this correlation.

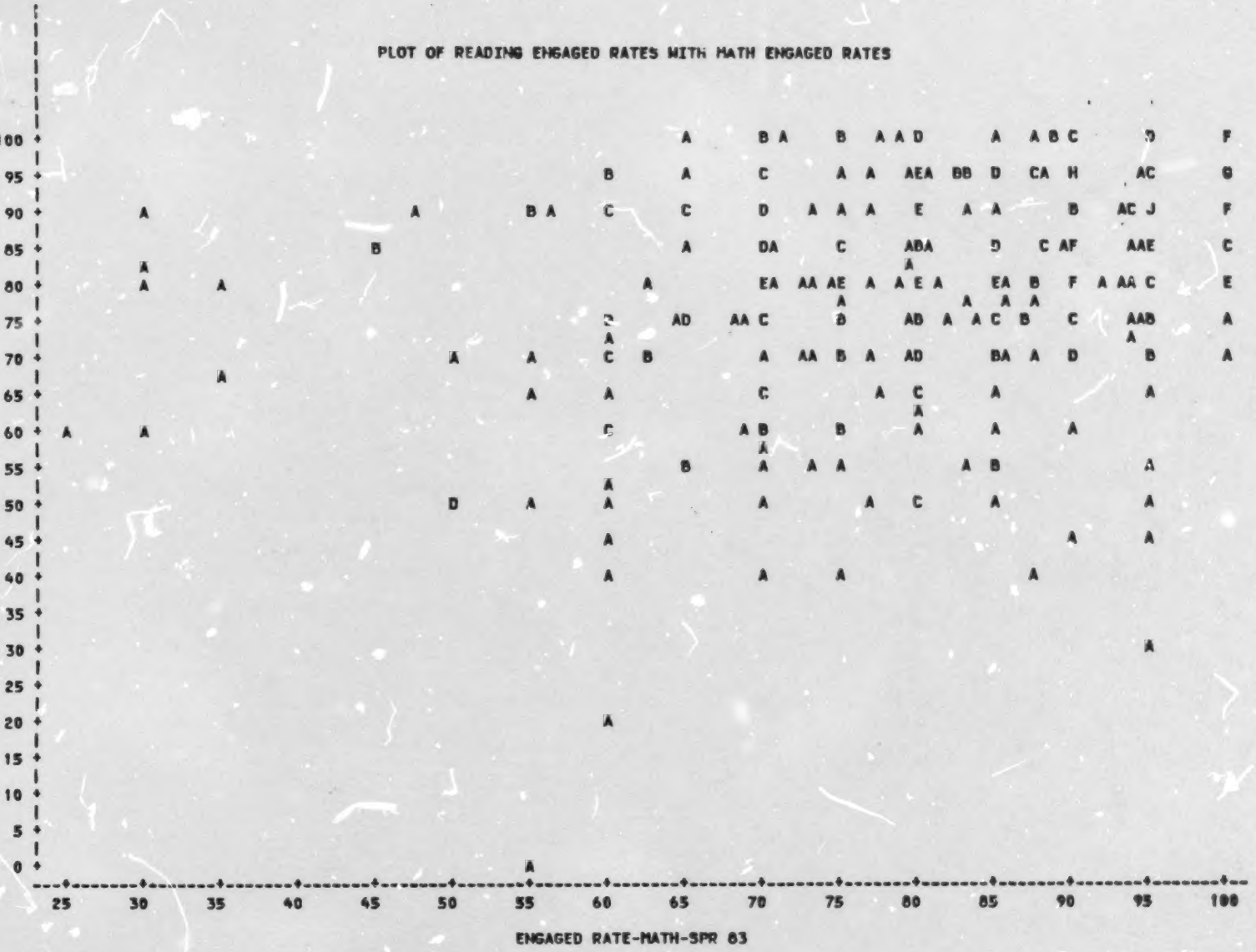

Figure 2

A = 1 student
B = 2 students
C = 3 students etc.

The letters on the figure represent the number of children at any one point, e.g., A=1 child, G=7 children. In the upper left corner of the figure are those children who were highly engaged in reading but not in math. In the lower right corner are those children who were highly engaged in math but not in reading. The engaged rate of these children must be related to the subject rather than to lack of ability to pay attention during class time. Teachers' awareness of these students could perhaps help them increase engaged rates in the other subject by providing more appropriate lessons. Children in the lower left corner are not engaged in either reading or math. These children most likely need help in building concentration skills to help them stay engaged during academic class time.

In order to benefit most from the time spent on academic tasks, kindergarten through fourth grade children need to be engaged at least 80% of the time. In this study, 137 of the 351 children observed in math did not meet this criterion. Of the 357 children observed in reading, 127 were engaged less than 80%. This suggests that teachers need to consider their organizational strategies and plan lessons that will help the chronically off task children use the available time more efficiently.

Limited English Speaking Children

The limited English speaking children at School #2 were taught in special classes. Thus, they were not observed in the reading or math classes and were not included in the achievement test sample.

Fifty-eight LES children were included in School #1's sample. Of these, 75% tested below the 25th percentile on the reading test, compared to 28% of their English speaking counterparts who tested at that level (see Table 6). This poor reading performance on the part of the LES children is not surprising given their problem in understanding the language. They tested somewhat better in math, which depends more on symbols and less on language (see Table 6). In spite of their difficulty with the language, the LES children were as attentive during the reading classes as were the other children. Approximately one-third of all the children were engaged 90% or more of the time. In math, 40% of the LES children were engaged over 90% of the time compared to 30% of the other children who were engaged at that rate.

Table 6

LIMITED ENGLISH SPEAKING STUDENTS

School #1 Reading and Math Achievement and Time Off Task

Reading Achievement Quartiles	0-25%	26-50%	51-75%	76-100%	Total
Limited English Speaking	44	12	3	0	59
Non Limited English Speaking	59	59	43	52	213
Total	103	71	46	52	272
Math Achievement Quartiles					
Limited English Speaking	31	18	6	3	58
Non Limited English Speaking	52	57	51	54	214
Total	83	75	57	57	272

Reading Time Off Task Deciles	0-10%	11-20%	21-30%	41-40%	51-50%	50-100%	Total
Limited English Speaking	17	13	9	6	5	2	52
Non Limited English Speaking	68	46	37	19	15	7	192
Total	85	59	46	25	20	9	244
Math Time Off Task Deciles							
Limited English Speaking	21	11	13	4	2	1	52
Non Limited English Speaking	55	50	37	28	8	8	186
Total	76	61	50	32	10	9	238

Instructional Skills

The Instructional Skills program is comprised of four separate skills: Anticipatory Set, Instruction, Guided Practice, and Independent Practice. Each teacher was observed and received a score in reading and math for each component and a total score which was the sum of all components. The total number of points that could be received was 88. Before looking at individual teachers' scores, it is of interest to see which components were best implemented before and after the training period.

To compute the percent of implementation for each component, the combined teacher scores were divided by the number of teachers x the number of possible points. Table 7 displays these winter and spring implementation scores.

Table 7

Winter and Spring Implementation Scores

	Winter		Spring	
	Math	Reading	Math	Reading
Anticipatory Set	41%	50%	63%	63%
Instruction	57%	59%	67%	67%
Guided Practice	56%	52%	71%	62%
Independent Practice	44%	45%	63%	61%

Except for "Independent Practice" and "Set" in math, the teachers were implementing approximately 50% of the program variables before the training program started. The training was provided during February, March, and April. The first component taught was

"Anticipatory Set" and this component was implemented 21% better in math and 13% better in reading after the training. "Instruction" was taught next in the training program, and this improved by approximately 10% in both reading and math.

"Guided Practice" was taught late in April just before the post observations. The highest implementation score on the table is in math "Guided Practice". Guided practice requires teachers to check children for understanding and monitor their work to be certain they are doing it correctly. The structure of math lessons seems to lend itself to guided practice, e.g., it may take the form of large or small group drill and practice or the teacher and students doing assignments on the chalkboard. Reading lessons are more likely to have the teacher instructing one small group while other students are doing independent seat work. The guided practice component is more likely to be omitted in reading class.

"Independent Practice" was taught late in the spring training program. Nevertheless, the teachers improved 19% in math and 16% in reading on this component. It means that children were given independent work after the teachers had checked for understanding and were certain they could do the work alone and not make errors.

For only three months of training, the implementation change scores are impressive, but allow for continued improvement in Phase III. Of course, within each school there were teachers who implemented the program at very high levels and those who did not. The ranges were from 86% by Teacher B in School #2 to a low of 29% by Teacher H in School #1. The teachers' pretest and posttest raw scores are presented on Tables 8 and 9.

TABLE 8

INSTRUCTIONAL SKILLS IMPLEMENTATION WINTER AND SPRING SCORES - SCHOOL #1

	ANTICIPATORY SET		INSTRUCTION		GUIDED PRACTICE		INDEPENDENT PRACTICE		TOTAL	
READING	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83
TEACHER A	7.5	15.0	25.5	28.0	22.5	26.0	8.0	8.0	63.5	77.0
B	9.5	11.0	20.5	21.0	15.5	8.0	4.0	8.5	49.5	48.5
C	4.0	13.0	19.0	27.0	18.0	23.5	9.0	5.0	50.0	68.5
D	8.5	12.5	21.0	30.5	18.0	26.0	7.5	12.0	55.0	81.0
E	4.5	8.5	17.5	14.5	16.0	6.5	1.0	3.5	39.0	33.0
F	0.5	4.0	3.5	15.5	0.0	13.0	0.0	2.0	4.0	34.5
G	6.5	9.5	21.0	19.0	19.0	17.5	3.5	2.5	50.0	48.5
H	8.0	9.0	21.0	12.5	8.0	4.0	5.0	6.0	42.0	31.50
I	0.0	8.0	1.0	14.0	2.5	2.0	4.0	6.5	7.5	30.5
SCHOOL AVERAGE	5.0	10.0	18.0	22.0	13.0	14.0	5.0	6.0	41.0	52.0
MATH										
TEACHER A	7.5	12.5	17.0	24.0	15.0	12.5	6.0	7.0	45.5	56.0
B	2.0	13.0	10.5	23.0	11.0	25.0	0.0	7.0	23.5	68.0
C	4.0	13.0	18.5	27.5	16.0	25.0	1.0	12.0	39.5	77.5
D	11.0	13.0	18.0	30.5	20.0	25.5	4.5	7.5	53.5	76.5
E	3.5	7.5	23.5	22.5	22.0	22.0	3.5	6.5	52.5	58.5
F	3.0	8.0	11.5	19.5	3.5	21.0	3.5	7.5	21.5	56.0
G	3.0	3.5	11.5	16.0	8.0	14.5	2.0	3.0	24.5	37.0
H	8.0	3.5	19.0	6.0	16.0	0.0	8.0	2.5	51.0	12.0
I	4.0	7.0	17.5	19.	15.0	8.0	0.0	0.5	31.5	35.0
SCHOOL AVERAGE	5.0	9.0	19.0	24.0	14.0	17.0	2.0	5.0	40.0	55.0

TABLE 9

INSTRUCTIONAL SKILLS IMPLEMENTATION WINTER AND SPRING SCORES - SCHOOL #2

	ANTICIPATORY SET		INSTRUCTION		GUIDED PRACTICE		INDEPENDENT PRACTICE		TOTAL	
READING	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83	WTR 82	SPR 83
TEACHER A	13.5	11.0	19.0	25.0	17.0	22.0	5.5	11.5	55.0	69.5
B	15.5	9.5	30.5	28.0	24.5	26.0	11.5	9.0	82.0	72.5
C	14.0	12.5	19.0	18.0	18.5	18.5	5.0	8.0	56.5	57.0
D	10.5	11.5	24.0	27.5	22.0	24.0	8.0	10.0	64.5	73.0
E	11.0	6.5	22.5	21.5	19.5	24.0	5.0	10.0	58.0	62.0
SCHOOL AVERAGE	13.0	10.0	23.0	24.0	19.0	22.0	7.0	10.0	62.0	66.0
MATH										
TEACHER A	8.0	11.5	17.5	28.0	14.5	23.5	8.5	8.5	48.5	71.5
B	14.0	13.0	26.0	26.5	25.0	26.5	10.5	11.0	75.5	77.0
C	14.0	13.5	20.0	0.0	18.5	24.0	10.0	9.0	62.5	46.5
D	14.0	10.5	25.0	28.5	19.0	27.0	9.0	10.0	67.0	76.0
E	8.0	11.0	18.0	26.5	15.0	24.5	8.0	14.0	49.0	76.0
SCHOOL AVERAGE	11.0	11.0	20.0	21.0	18.0	25.0	9.0	10.0	58.0	67.0

Overall, the teachers in School #1 improved their implementation scores somewhat on each of the four variables in reading and math classes. Teachers A, C, D, F, and I improved impressively in using "Instructional Skills" in reading. Teachers B, C, and E improved all four variables in implementing the program in math. Teacher D implemented the program better in reading and math than did other teachers and also had the highest student engaged rate of all teachers in the study (91%).

Several teachers in School #1 made very little improvement and some teachers (G and H) actually did less well in the spring than in the winter. These teachers also had a higher percent of children off task than other teachers. It appears that teachers who implement the model well also were able to keep students on task during the instruction periods.

In School #2, the principal had been trained in Instructional Skills during the previous years and had shared some of the ideas with his teachers, consequently the teachers started in the winter with higher implementation scores than did teachers in School #1. However, by spring School #1 had caught up on "Set" and "Instruction" in reading. School #2 continued to be higher on "Guided Practice" and "Independent Practice" in both reading and math.

One anomaly in School #2's data is Teacher B. She started the study with scores higher than any other teacher. She had received some training in the Instructional Skills program during the previous years. Although her scores stayed quite high, they were not maintained at the high level recorded on the winter preobservation. Another anomaly occurred with Teacher C in math. She had 20 points for Instruction during the pretest and 0 points on the

postobservation. The observer's log indicated that her lessons in math for the two observed days were review: new information or concepts were not introduced. In reading her score for Instruction remained approximately the same in winter and spring.

Correlations

To examine the relationship between student engaged rates, achievement test scores, gain on achievement tests, and teachers' instructional skills, Spearman rank order correlations were computed using the 14 teachers for whom there were complete data sets. The correlations were computed separately for reading and math. The results of these analyses are presented in Tables 10 and 11.

There were 12 significant relationships found between student engaged rate, 1983 math achievement test scores, and Instructional Skills. Total Instructional Skills scores correlated (r=.73) with engaged rate, (r=.81) with 1983 achievement test scores, and (r=.65) with gain in math. These are impressive figures even with only 13 teachers in the sample.

As may be expected, the Instructional Skills total score correlated significantly with all four subscales and the subscales tended to correlate with each other. Guided Practice seemed to be one of the most effective components in that it related importantly with 1983 math scores, math gain scores, and engaged rate. Independent Practice related to 1983 math scores and engaged rate. Instruction related only to engaged rate and Set related only the math gain scores.

Table 10

READING -- Spearman Correlation Coefficients, Spring 1983

		Mean Achievement	Mean Gain	Instructional Skills	Anticipatory Set	Instruction	Guided Practice	Independent Practice
Engaged Rate	r =	.65*	.35	.43	.14	.46	.45	.43
	p <	.01	.21	.12	.63	.09	.11	.13
Mean Achievement	r =		.24	.13	- .13	.14	.28	.10
	p <		.42	.65	.66	.64	.34	.73
Mean Gain	r =			- .16	.00	- .07	- .19	- .44
	p <			.58	1.00	.81	.51	.12
Instructional Skills	r =				.69*	.97*	.95*	.68*
	p <				.01	.01	.01	.01
Anticipatory Set	r =					.64*	.55*	.33
	p <					.01	.04	.24
Instruction	r =						.94*	.64*
	p <						.01	.01
Guided Practice	r =							.59*
	p <							.03

Variable	Number	Mean	Standard Deviation	Median	Minimum	Maximum
Engaged Rate	14	80.13	7.03	80.77	63.35	91.30
Mean Achievement	14	45.54	9.60	47.96	27.85	59.26
Mean Gain	14	- 0.61	10.35	- 1.61	- 23.10	17.96
Instructional Skills	14	56.21	18.30	59.50	30.50	81.00
Anticipatory Set	14	10.11	2.86	10.25	4.00	15.00
Instruction	14	21.57	6.11	21.25	12.50	30.50
Guided Practice	14	17.21	8.82	20.25	2.00	26.00
Independent Practice	14	7.32	3.20	8.00	2.00	12.00

*Significant at .05 or above

Table 11

MATH -- Spearman Correlation Coefficients, Spring 1983

		Mean Achievement	Mean Gain	Instructional Skills	Achievement Set	Instruction	Guided Practice	Independent Practice
Engaged Rate	r =	.69*	.36	.73*	.51	.52*	.76*	.72*
	p <	.01	.20	.01	.06	.05	.01	.01
Mean Achievement	r =		.59*	.81*	.47	.50	.77*	.73*
	p <		.03	.01	.09	.07	.01	.01
Mean Gain	r =			.64*	.62*	.32	.61*	.43
	p <			.02	.02	.27	.03	.12
Instructional Skills	r =				.81*	.85*	.90*	.87*
	p <				.01	.01	.01	.01
Anticipatory Set	r =					.37	.70*	.62*
	p <					.19	.01	.02
Instruction	r =						.80*	.56*
	p <						.01	.04
Guided Practice	r =							.74*
	p <							.01

Variable	Number	Mean	Standard Deviation	Median	Minimum	Maximum
Engaged Rate	14	80.46	6.18	79.18	71.85	90.53
Mean Achievement	14	52.82	16.11	54.10	21.15	78.19
Mean Gain	14	2.06	7.60	2.67	- 14.60	13.48
Instructional Skills	13	59.77	20.54	68.00	12.00	77.50
Anticipatory Set	14	10.04	3.53	11.25	3.50	13.50
Instruction	14	21.29	8.80	23.50	0.00	30.50
Guided Practice	13	19.62	8.35	23.50	0.00	27.00
Independent Practice	14	7.57	3.72	7.50	0.50	14.00

*Significant at .05 or above

Overall we must conclude that the use of the Instructional Skills model was effective in helping children stay engaged during math classes and in promoting student gains in mathematics.

For reading there were very few significant correlations. Reading gain was not even related to 1983 achievement test scores which cast some doubt upon the validity of the test scores. Engaged rate was related to spring 1983 achievement test scores (r=.65) but was not related to reading gain scores. There were only low correlations between engaged rate and three of the Instructional Skills variables: Instruction (r=.43), Guided Practice (r=.45), and Independent Practice (r=.43). Total Instructional Skills did correlate with all four subscales, and the four subscales correlated with each other, but not with student achievement in reading.

The explanation for the differences in the findings for reading and math may be in the different procedures used to teach math and reading. A reading lesson is likely to have several objectives, e.g., learning to incode and decode syllables and words. Multiple objectives may, in fact, be confusing to children. The Set and Guided Practice may be embedded in the instruction. Teachers tend to have set routines for teaching several reading groups and these procedures may not have been very amenable to change. Apparently it was easier to incorporate the Instructional Skills into math lessons because, on the average, teachers improved reading implementation by 9.3 points from winter to spring, while on math they improved by 24 points during the same time period.

SUMMARY AND CONCLUSIONS

The Napa County Follow Through version of Madeline Hunter's Instructional Skills model of education can be observed objectively and implementation in the classroom can be measured. The observation system developed for the project was sensitive enough to measure teachers' use of four model components before and after the training program. Although the Hunter model of education has been used widely throughout the United States, it has not been previously systematically observed so that the quality and quantity of the implementation were measured. This study of implementation makes a major contribution toward validating the Hunter model.

Nine of the 14 teachers in the study improved or maintained their use of instructional skills to an acceptable level.

Student engaged rate was measured in the fall and spring for every child in the study. Students in all of the classrooms except one were more attentive to their lessons in the spring of 1983 than in the fall of 1982.

As in studies by Brophy and Evertson (1974), and Stallings (1975), student engaged rate and achievement in math and reading were significantly correlated ($p < .01$). With such correlations, it is still important to remember this is not a perfect relationship: thirty-two children testing below the 25th percentile were found to be on task 90% or more of the time. Since none of these children were identified as being unable to learn, it appears that the lessons may have been inappropriate. Another five children were off task 50% or more of the time and were testing above the 75th percentile. Their lessons may also have been inappropriately easy. Imagine what they might do if they gave good attention.

Another finding was that engaged rate is not constant across subject matter. Some students highly engaged in reading classes were not so highly engaged during math period. Other students highly engaged in math were off task often during reading. These students' propensity to stay on task may be conditioned by their interest in the subject matter. Another interesting analysis of the data was conducted by Rogosa (1984). He looked at the duration of engaged rate for first grades and fourth grades. The first grades tended to be on task for ten minutes and then off task. The fourth grades duration rates were longer (20 minutes). Findings such as these could have important implication for planning lessons and length of time allocated to one activity.

Achievement gains for each school were examined by comparing the change in the number of students in each quartile of achievement in 1982 and 1983. School #1 had 5% fewer students below the 25th percentile in 1983 and 4% more above the 75th percentile. Students in School #2 stayed about the same in reading but made shifts upward in math in the lowest quartile and the highest quartile. These data suggest that the lowest and highest performing students are making progress, particularly in mathematics.

The major purpose of the study was to examine the relationship between student engaged rates and achievement in math and reading and program implementation. All of these relationships will be examined over the three years of the project.

The Spearman correlations confirmed hypothesis regarding the positive relationships between student engaged rate and achievement in math and reading. Interestingly, the hypothesis regarding positive relationship between engaged rate, student achievement and program

implementation was confirmed for math but not for reading.

At this point, it is hard to explain the difference in findings for reading and math. It may be that the more linear structure of math makes it easier to implement the components of instructional skills and make it easier to observe than is reading. Reading tends to be taught in several small groups and the four model components may not be implemented in each group or it may be harder for the observer to follow and record the many changes of activities in a reading class. In the latter case, the error is in the measurement.

Fortunately, this analysis using the same instruments will be conducted for data collected in 1983, 1984 and 1984-1985. Control classrooms will be included in these studies. If the findings of this study are replicated, we will have more confidence in the results, and conclude that Hunter's Instructional Skills model is effective for math and not for reading. At this time, it is premature to make such a conclusion and our finding must be regarded as tentative.

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